TECHNICAL MEMORANDUM FOR THE ASSESSMENT OF NOISE FROM PLACES OTHER THAN DOMESTIC PREMISES, PUBLIC PLACES OR CONSTRUCTION SITES

Legend

Character/Style	Description
CG Times	Revised
CG Times	Original
~~CG Times~~	Deleted Text

TABLE OF CONTENTS

		Page
1. PRELIMINARY		
1.1	Citation and Commencement	4
1.2	Application and Scope	4
1.3	Interpretation	4
1.4	General Introduction to the Procedures	4
2. DETERMINATION OF THE ACCEPTABLE NOISE LEVEL		
2.1	General	5
2.2	Location of the Noise Sensitive Receiver (NSR)	5
2.3	Determination of the Area Sensitivity Rating (ASR)	5
2.4	Determination of the Acceptable Noise Level (ANL)	6
3. MEASUREMENT OF THE NOISE UNDER INVESTIGATION		
3.1	General	7
3.2	Determination of the Measured Noise Level (MNL)	7
3.3	Determination of the Corrected Noise Level (CNL)	8
4. ISSUING A NOISE ABATEMENT NOTICE AND TESTING FOR COMPLIANCE		9
ANNEX–GENERAL CALIBRATION AND MEASUREMENT PROCEDURES		9

LIST OF TABLES

Table 1	Area Sensitivity Ratings (ASRs)	6
Table 2	Acceptable Noise Levels (ANLs)	7
Table 3	Tonality Correction	8
Table 4	Intermittency Correction	9

TECHNICAL MEMORANDUM FOR THE ASSESSMENT OF NOISE FROM PLACES OTHER THAN DOMESTIC PREMISES, PUBLIC PLACES OR CONSTRUCTION SITES

1. PRELIMINARY

1.1 Citation and Commencement

This Technical Memorandum is issued pursuant to section 10 of the Noise Control Ordinance and may be cited as the Technical Memorandum for the Assessment of Noise from Places other than Domestic Premises, Public Places or Construction Sites. **This Technical Memorandum shall replace the existing one that was originally published under section 11(1) of the Noise Control Ordinance in Special Supplement No.5 to Gazette Extraordinary No.38 Vol. CXXX on 7 November 1988 and came into operation on 7 December 1988.** This Technical Memorandum shall come into operation in accordance with section 12 of the Noise Control Ordinance.

1.2 Application and Scope

This Technical Memorandum details the procedures that should generally be adopted by the Authority for the measurement and assessment of noise emanating from places other than domestic premises, public places or construction sites, for the issuing of Noise Abatement Notices pursuant to section 13(1)(c) of the Ordinance and for determining whether or not any Noise Abatement Notice is being complied with.

1.3 Interpretation

In this Technical Memorandum, unless the context otherwise requires, the following definitions apply:–

"Authority" has the same meaning as in the Ordinance;

"construction site" has the same meaning as in the Ordinance;

"domestic premises" has the same meaning as in the Ordinance;

"Ordinance" means the Noise Control Ordinance;

"place" has the same meaning as in the Ordinance; and

"public place" has the same meaning as in the Ordinance.

Standard acoustical terminology is used throughout this Technical Memorandum. Other terms are as defined in the Ordinance or in the text of this Technical Memorandum.

1.4 General Introduction to the Procedures

When investigating a complaint regarding noise emanating from places or premises falling within the scope of this Technical Memorandum the Authority shall generally act in accordance with the following procedures which are detailed in subsequent sections. The Authority shall:--

(a) determine the appropriate Acceptable Noise Level for the Noise Sensitive Receiver in question (in accordance with Section 2);

(b) conduct measurements to obtain the Corrected Noise Level of the noise under investigation (in accordance with Section 3); and

(c) compare the Corrected Noise Level with the Acceptable Noise Level to determine if a Noise Abatement Notice may be issued (in accordance with Section 4).

2. DETERMINATION OF THE ACCEPTABLE NOISE LEVEL

2.1 General

The appropriate Acceptable Noise Level (ANL) for a particular Noise Sensitive Receiver (NSR) is dependent upon the character of the area within which the NSR is located, and the time of day under consideration. The steps to be followed in determining an ANL are as follows:--

(a) identify the NSR, in accordance with Section 2.2;

(b) determine the Area Sensitivity Rating (ASR) of the area within which the NSR is located, in accordance with Section 2.3; and

(c) determine the ANL from the appropriate table in Section 2.4, by reference to the ASR and the time period under consideration.

2.2 Location of the Noise Sensitive Receiver (NSR)

For the purpose of this Technical Memorandum any domestic premises, hotel, hostel, temporary housing accommodation, hospital, medical clinic, educational institution, place of public worship, library, court of law or performing arts centre shall be considered to be a NSR. Any other premises or place, not being in the nature of either industrial or commercial premises, which is considered by the Authority to have a similar sensitivity to noise as the premises and places above shall also be considered to be a NSR. Any premises or place shall, however, be considered to be a NSR only when it is in use for its intended purpose.

2.3 Determination of the Area Sensitivity Rating (ASR)

2.3.1 General

The ASR is a function of the type of area within which the NSR is located and the degree of the effect on the NSR of particular Influencing Factors (IFs) as defined in Section 2.2.3. After a careful examination of the area under consideration and the effect of any IFs, the ASR may be determined from Table 1.

2.3.2 Type of area within which the Noise Sensitive Receiver (NSR) is located

The Authority shall have regard to an area of adequate size when determining the type of area within which the NSR is located in accordance with the descriptions in Table 1. Typically, in urban areas an area of 100 m radius around the NSR should be adequate, whereas in sparsely developed areas, such as rural districts, an area of 500 m radius or even more should be considered, depending upon the circumstances. Special factors may dictate that other distances should be used at the discretion of the Authority.

2.3.3 Effect of Influencing Factors (IFs)

For the purpose of this Technical Memorandum any industrial area, major road or the area within the boundary of Hong Kong International Airport shall be considered to be an IF. Industrial areas and the Airport should be regarded as IFs irrespective of the time of day.

The term "industrial area" means an area which consists of a ~~significant~~ number of factories or industrial undertakings located primarily in purpose-built industrial buildings. **It includes any premises, buildings or activities which the Authority deems, by virtue of their acoustical characteristics, make an area industrial in nature.** The term "major road" means a road which has a heavy and generally continuous flow of vehicular traffic and, in normal circumstances, means a road with an annual average daily traffic flow in excess of 30,000. Where a major road has an unusually low traffic flow rate (less than 300 vehicles per hour) at the time of day under consideration it shall not be considered as an IF at that time.

In situations where more than one IF affects the NSR to an equal degree only one IF shall be considered.

2.3.4 Area Sensitivity Rating (ASR)

The Authority shall determine the appropriate ASR for the NSR under consideration from Table 1.

Any NSR shall, irrespective of Table I, be assigned an ASR of "C" if it is within 100 m of a zone designated as "Industrial" or "Industrial Estate" on a statutory Outline Zoning Plan, or an ASR of "B" if it is between 100 m and 250 m from such a zone, except in cases where Table 1 indicates an ASR of "C".

Table 1--Area Sensitivity Ratings (ASRs)

Type of Area Containing NSR / Degree to which NSR is affected by IF	Not Affected	Indirectly Affected	Directly Affected
(i) Rural area, including country parks or village type developments	A	B	B
(ii) Low density residential area consisting of low-rise or isolated high-rise developments	A	B	C
(iii) Urban area	B	C	C
(iv) Area other than those above	B	B	C

For the purpose of Table 1 the following definitions shall apply:--

"country park" means an area that is designated as a country park pursuant to section 14 of the Country Parks Ordinance;

"directly affected" means that the NSR is at such a location that noise generated by the IF is readily noticeable at the NSR and is a dominant feature of the noise climate of the NSR;

"indirectly affected" means that the NSR is at such a location that noise generated by the IF, whilst noticeable at the NSR, is not a dominant feature of the noise climate of the NSR;

"not affected" means that the NSR is at such a location that noise generated by the IF is not noticeable at the NSR; and

"urban area" means an area of high density, diverse development including a mixture of such elements as industrial activities, major trade or commercial activities and residential premises.

2.4 Determination of the Acceptable Noise Level (ANL)

The appropriate ANL, in dB(A), for a given NSR may be determined from Table 2 ~~or Table 3~~, having regard to the appropriate ASR and the time period under consideration.

~~Table 2 Acceptable Noise Levels (ANLs) effective from the date on which section 13 of the Ordinance comes into operation until a date 3 years later~~

~~ASR~~ ~~Time Period~~	~~A~~	~~B~~	~~C~~
~~Day (0700 to 1900 hours)~~	~~65~~	~~70~~	~~75~~
~~Evening (1900 to 2300 hours)~~	~~60~~	~~65~~	~~70~~
~~Night (2300 to 0700 hours)~~	~~50~~	~~55~~	~~65~~

~~Table 3 Acceptable Noise Levels (ANLs) effective from the date 3 years after section 13 of the Ordinance comes into operation~~

Table 2 --Acceptable Noise Levels (ANLs)

ASR Time Period	A	B	C
Day (0700 to 1900 hours)	60	65	70
Evening (1900 to 2300 hours)			
Night (2300 to 0700 hours)	50	55	60

Where the noise under investigation is being received within a building from a noise source located on or within the same or an adjoining building such that the noise is transmitted primarily through the structural elements of the building or buildings, the appropriate ANL shall be 10 dB(A) less than the relevant ANL as shown in Table 2. **A similar adjustment should be made to the relevant ANL if the point of assessment is at an internal location of a building in which the NSR is located.**

3. MEASUREMENT OF THE NOISE UNDER INVESTIGATION

3.1 General

The Authority should measure the noise under investigation in accordance with the procedures outlined in Section 3.2. Corrections may need to be applied to the Measured Noise Level (MNL) to account for certain noticeable characteristics of the noise and these shall be made in accordance with Section 3.3 to determine the Corrected Noise Level (CNL).

Where the NSR is considered by the Authority to be materially affected by one or more other noise sources falling within the scope of this Technical Memorandum, the Authority shall assess the noise under investigation in a manner which the Authority considers appropriate in the circumstances, having regard to standard acoustical principles and practices.

3.2 Determination of the Measured Noise Level (MNL)

The MNL of the noise under investigation shall be measured over ~~any 30 minute~~ a Sample Time Period (STP) by the Authority in accordance with the calibration and measurement procedures detailed in the Annex. An adjustment may be made where appropriate to allow for the influence of the background noise, in accordance with standard acoustical principles and practices.

3.3 Determination of the Corrected Noise Level (CNL)

3.3.1 General

Where the noise under investigation is considered by the Authority to have tonal, impulsive or intermittent characteristics, appropriate corrections shall be made to the MNL to obtain the CNL, as detailed below.

3.3.2 Correction for Tonality

A correction for tonality shall be applied if, between 31.5 Hz and 16 kHz, any one-third octave band or any pair of adjacent one-third octave bands of the A-weighted spectrum of the noise under investigation satisfies all of the following conditions:--

(a) the level of the one-third octave band under consideration, or, in the case of a pair of bands, the level of the highest band in that pair, is not more than 15.0 dB below the level of the highest one-third octave band;

(b) the level of the one-third octave band under consideration, or, in the case of a pair of bands, the arithmetic average of the levels of the two bands, is more than 1.0 dB higher than the level of each of the adjacent bands on either side of the band or pair of bands under consideration; and

(c) the level difference, known as the tonality factor, f_{tone}, between the level of the one-third octave band under consideration, or, in the case Of a pair of bands, the arithmetic average Of the levels of the two bands, and the arithmetic average of the levels of the adjacent bands on either side of the band or pair of bands under consideration is 3.0 dB or more.

The analysis to determine if a tonal correction is necessary shall be carried out over such a time period or periods as the Authority considers appropriate within the STP, so as to be representative of the tonal characteristics of the noise under investigation.

Where the noise under investigation is assessed to have a tonal characteristic with a tonality factor, f_{tone}, the correction, c_{tone}, to the MNL shall be as shown in Table 3.

Table 3--Tonality Correction

	c_{tone} (dB(A))	
f_{tone}(dB)	in cases where the frequency of any band under consideration is below 250 Hz	in cases where the frequency of each band under consideration is equal to or greater than 250 Hz
greater than or equal to 3.0 and less than 6.0	0	3
greater than or equal to 6.0 and less than 9.0	3	6
greater than or equal to 9.0	6	6

3.3.3 Correction for Impulsiveness

If the noise under investigation is considered by the Authority to be impulsive in character a positive correction, c_{imp}, of not more than 3 dB(A) may be applied to the MNL.

3.3.4 Correction for Intermittency

A correction for intermittency shall be applied to the MNL, for the night-time period (2300 to 0700 hours) only, when the A-weighted sound pressure level of the noise under investigation is subject to rapid changes in level of 5.0 dB(A) or more occurring with a degree of regularity within the STP, the typical magnitude of these changes in level being known as the intermittency factor, f_{int}.

Where the noise under investigation is assessed to have an intermittent characteristic with an intermittency factor, f_{int}, the correction, c_{int}, to the MNL shall be as shown in Table 4.

Table 4--Intermittency Correction

f_{int} (dB(A))	c_{int} (dB(A))
greater than or equal to 5.0 and less than 10.0	3
greater than or equal to 10.0	6

3.3.5 Calculation of Corrected Noise Level (CNL)

The CNL shall be calculated by applying the appropriate corrections to the MNL in accordance with the following formula:--

$$CNL = MNL + c_{tone} + c_{imp} + c_{int}\ dB(A)$$

4. ISSUING A NOISE ABATEMENT NOTICE AND TESTING FOR COMPLIANCE

The CNL shall be compared with the ANL. When the CNL is greater than the ANL, the Authority may issue a Noise Abatement Notice (NAN). In cases where a NAN has already been issued the Authority shall compare the CNL, measured at a point as specified in the NAN, with such requirements as may be specified in the NAN to determine if the NAN is being complied with.

ANNEX--GENERAL CALIBRATION AND MEASUREMENT PROCEDURES

1. Instrumentation

For the purpose of this Technical Memorandum sound level meters shall comply with International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1), and other noise measuring and analysis instrumentation shall be of a comparable professional quality. Standard acoustical principles and practices shall be followed in the measurement and analysis of the noise under investigation.

2. Calibration Procedures

Immediately prior to and following each noise measurement the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration levels from before and after the noise measurement agree to within 1.0 dB.

3. Measurement Procedures

3.1 Assessment Point

Noise levels shall be determined by carrying out measurements at the assessment point. Where a measurement is to be carried out at a building, the assessment point shall normally be at a position 1 m from the exterior of the building facade but may be at any other point considered to be appropriate by the Authority. Where a measurement is to be made of noise being received at a place other than a building, the assessment point shall be at a position 1.2 m above the ground, at a particular point considered appropriate by the Authority.

Where the noise under investigation is ~~being received within a building from a noise source located on or within the same or an adjoining building such that the noise is~~ transmitted **to the NSR** primarily **either** through the structural elements of the building ~~or buildings~~, **through openings other than those at the facade of the building; or through specially provided glazing at the facade of the building as considers appropriate for reducing the noise,** the assessment point shall be at a particular internal location which the Authority considers appropriate having regard to the normal occupancy of the building.

3.2 Noise Units and Descriptors

Any noise measurement to determine the MNL shall be made in terms of the A-weighted equivalent continuous sound pressure level (Leq) measured with an integrating sound level meter. Such measurement shall be made over any 30 minute period **or any shorter period when the Authority is satisfied that the noise under investigation is essentially steady over a 30 minute period,** which shall be taken to be the STP.

3.3 Rounding of Noise Levels

With the exception of the CNL which should be calculated to the nearest whole dB(A), with values of 0.5 or more being rounded upwards, other measured or calculated noise levels shall be determined to the nearest 0.1 dB(A) or dB, with values of 0.05 or more being rounded upwards.

3.4 Weather Conditions

Noise measurements should ~~not be made in the presence of fog, rain, wind with a steady speed exceeding 5 m/s, or wind with gusts exceeding 10 m/s~~ **be made in accordance with standard acoustical principles and practices in relation to weather conditions.**